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10/588,946	05/22/2007	Shuichi Onuma	Q96170	9742

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
MAKI, STEVEN D	

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

Office Action Summary	Application No.	Applicant(s)	
	10/588,946	ONUMA ET AL.	
	Examiner	Art Unit	
	Steven D. Maki	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *081006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1) The disclosure is objected to because of the following informalities: On line 1 of page 7 of the specification, --of the tire-- should be inserted after 'the nominal outer diameter".

Appropriate correction is required.

2) The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3) Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 lines 20-23, there is no antecedent basis for "the base tread rubber" and "the cap tread rubber". In claim 1, after "in this order,", it is suggested to insert --the base tread layer comprising base tread rubber and the cap tread layer comprising cap tread rubber,--.

In claim 4 (dependent on claim 1), there is no antecedent basis for "the circumferential grooves"; it being noted that claim 1 recites "at least one circumferential groove". In claim 4, after "wherein" (line 2), it is suggested to insert --circumferential grooves are provided in the surface of the top tread and--.

Claim 4 line 7, ambiguously refers to "the nominal outer diameter". In claim 4, after "the nominal outer diameter" (line 7), it is suggested to insert --of the tire--.

In claim 5 (dependent on claim 1), there is no antecedent basis for "the circumferential grooves"; it being noted that claim 1 recites "at least one circumferential

groove". In claim 5, after "wherein" (line 2), it is suggested to insert --circumferential grooves are provided in the surface of the top tread and--.

4) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5) **Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 305 (JP 04-118305) in view of Corvasce et al (US 6,036,800), Greiner et al (US 3,759,306) and Fourgon (US 5,718,782).**

Japan 305 discloses a pneumatic AIRCRAFT TIRE comprising a tread 5, beads with bead cores 2, a carcass 7 wrapped around bead cores 2 and a cut protector 16 (crown protective layer) wherein the tread comprises four circumferential grooves 8. See Figure 1 and abstract. The tread comprises a **cap tread rubber layer 11** and a **base rubber layer 12**. The thickness T1 between the outward plane of the cut protector 16 and the bottom 8a of the groove 8 is 8% to 40% of the thickness T0 between the outward plane of the cut protector 16 and the outer surface of the tread 5. In short,

T1 = 8% to 40% T0

See abstract. As can be seen from Figure 2, the thickness of the base tread rubber layer 12 is greater than thickness T0. Japan 305 discloses providing the cap layer 11 with a 100% modulus of 20 kg/cm2 to 30 kg/cm2 (1.96 MPa to 2.94 MPa). See page 5 lines 13-17 of bottom right column. Japan 305 discloses providing the base layer 12

with a 100% modulus of 20 kg/cm2 to 30 kg/cm2 (1.96 MPa to 2.94 MPa). See page 6 lines 19-20 of upper left column and lines 1-3 of upper right column. Japan 305 discloses the AIRCRAFT TIRE as having a tire size such as 46X17R20. See page 9 line 17 of left column. Japan 305 discloses three invention examples. See Table 2 on page 10. In invention example 1, the cap has a 100% modulus of 25 kg/cm2 (2.45 MPa) and the base has a 100% modulus of 25 kg/cm2 (2.45 MPa). See Table 2. Japan 305 does not recite that the 50% modulus of the base tread rubber layer 12 is 105% to 130% of the 50% modulus of the cap tread rubber layer 11.

As to claim 1, it would have been obvious to one of ordinary skill in the art to provide the cap base tread of Japan 305's AIRCRAFT TIRE such that:

the 50% modulus of the base tread rubber layer 12 is 105% to 130% of

the 50% modulus of the cap tread rubber layer 11

since:

(1) Japan 305 discloses providing a cap base tread of an AIRCRAFT TIRE such that the **tread base** has a 100% modulus of 1.96 to 2.96 MPa (20 to 30 kg/cm2) and the **tread cap** has a 100% modulus of 1.96 to 2.96 MPa (20 to 30 kg/cm2);

(2) Corvasce et al suggests providing a cap base tread of an AIRCRAFT TIRE such that the **tread base** has a relatively high stiffness (e.g. 100% modulus of 3.5 MPa or 4.5 MPa) and the **tread cap** has a relatively low stiffness so as to obtain an optimum stress transmission (balance between stress transmission and stress absorption by the tread base) so that tire operations such as braking are enhanced (col. 1 lines 19-67, col. 2 lines 1-7, col. 8 lines 23-2, Table 2, col. 12 lines 63-64) wherein the desired relatively

high modulus for the tread base is obtained by including 5-80 parts of polyethylene particles having a molecular weight greater than 1,000,000 in the tread base (col. 3 lines 23-45, col. 5 lines 44-53, col. 12 lines 23-27); and

(3) Greiner et al suggests providing a cap base tread of an AIRCRAFT TIRE such that the **tread base 12b** comprises a rubber composition having a 100% modulus of greater than 3.92 MPa (40 kg/cm2) and the **tread cap 12a** comprises a "customary" rubber composition having 100% modulus of 1.96 to 2.45 MPa (20 to 25 kg/cm2) so that the resistance to tearing of the sculptured tread cap 12a is increased due to the base of the sculptured portions of the tread cap 12a being more rigidly anchored and the stresses at the bottom of the hollows of the tread cap being displaced and better endured by the tread base 12b (col. 1 lines 4-11, col. 2 lines 10-44, col. 3 lines 19-26, col. 4 lines 5-34) wherein the desired relatively high modulus tread base may be obtained by including finely divided polyolefin having a molecular mass greater than 500,000 (columns 5 and 6).

Hence, Japan 305, Corvasce et al and Greiner et al are directed to the same structure of a pneumatic aircraft tire with a tread having a cap base construction. Corvasce et al and Greiner et al provide ample motivation (improved braking and prevention of tearing of cap tread) to provide Japan 305's aircraft tire such that the tread base rubber layer has larger 100% modulus than the 100% modulus of the tread cap rubber layer. One of ordinary skill in the art would readily understand that the 50% modulus of a rubber layer is less than the 100% modulus of the rubber layer since the percent elongation of the rubber for the 50% modulus test is 1/2 of the percent

elongation of rubber for the 100% modulus test. The optimum ratio of the 100% modulus (base) to the 100% modulus (cap) (and consequently optimum ratio of the 50% modulus (base) to the 50% modulus (cap)) would have been obvious and could have been determined without undue experimentation in view of Corvasce et al and Griener et al's teaching to optimize stress transmission by providing the tread base rubber layer with a greater modulus than the modulus of the tread cap rubber layer so that braking and tearing resistance are improved. It is noted that, when modulus of the tread base is increased to 3.5 MPa (as per the example in Corvasce et al) and the tread cap has a modulus of 2.94 MPa (as per the disclosure of Japan 305), then the ratio of modulus (BASE) to modulus (CAP) is 1.19 (3.5 MPa / 2.94 MPa). The value of 1.19 falls within the claimed range of 1.04 to 1.20.

Furthermore, it would have been obvious to one of ordinary skill in the art to provide the cap base tread of Japan 305's AIRCRAFT TIRE such that

> the resilience Rb of the tread base is 104 to 120% of the resilience Rc of the tread cap

since

(1) Corvasce et al suggests providing the cap base tread of an AIRCRAFT TIRE such that the **tread base** has a relatively low hysteresis and the **tread cap** has a relatively high hysteresis so that the tread base has good rubber hysteresis so that it generates less heat from the stresses transmitted by the solicitations of the rubber tread cap (col. 1 lines 49-55, col. 2 lines 1-7, 53-65, col. 13 lines 42-48) wherein the tread base rubber layer may have a rebound (resilience) of 78 (Table 2) and

(2) Fourgon, also directed to addressing the problem of heat generation in a heavy load vehicle, teaches that *rebound is indicative of rubber composition's hysteresis* which in turn is predictive of a measure of potential internal heat generation for the rubber composition during dynamic working conditions (col. 8 lines 31-42); and

(3) Fourgon teaches an example TIRE in which the **tread base** has a "relatively low hysteresis" (relatively high rebound of 81) and the **tread cap** has a "relatively high hysteresis" (relatively low rebound of 66.4) wherein the tread cap and tread base cooperate together to promote improved tread wear and obtain sufficiently low internal operating temperatures so as to minimize heat degradation of the tread rubber compositions and thereby manifest a longer service life for the tire (col. 1 lines 7-10, col. 4 lines 5-14, Table 2). When the tread base has a rebound (resilience) of 78 as per Corvasce et al and the tread cap has a rebound (resilience) of 66.4 as per Fourgon, then the ratio of Rb (resilience base) to Rc (resilience cap) is 1.17 (1.17 = 78 / 66.4). The value of 1.17 falls within the claimed range of 1.04 to 1.20. The expected and predicable result is lower internal heat generation and longer tire life (Corvase et al and Fourgon). It is noted that Corvasce et al teaches that the tread base should have both relatively low hysteresis and relatively high stiffness and that the tread cap should have both relatively high hysteresis and relatively low stiffness.

As to claim 2, it would have been obvious to one of ordinary to provide Japan 305's cap base tread such that the ratio of "Gb" to "Gb + Gc" is 0.15 to 0.50 (base thickness (Gb) = 15% to 50% total tread thickness ("Gb + Gc")) in a region occupying at least 90% of the crown protective layer width, except a portion directly under the

circumferential groove and occupied by the circumferential groove width since (1) Japan 305 teaches that the thickness T1 is 8-40% total tread thickness T0, (2) Japan 305 shows the thickness of the tread base being greater than the thickness T1 (Figure 2) and (3) Japan 305 and Greiner et al show the tread base of an aircraft tire having the same width as a crown protective layer (Figures 1 and 2 of Japan 305 and Figure 3 of Greiner et al).

6) **Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 305 (JP 04-118305) in view of Corvasce et al (US 6,036,800), Greiner et al (US 3,759,306) and Fourgon (US 5,718,782) as applied above and further in view of Japan 507 (JP 05-301507).**

As to claim 4, it would have been obvious to one of ordinary skill in the art to provide the center circumferential grooves such that h (depth of center circumferential grooves) is 0.9% of H (nominal tire diameter) depending on the desired tire size since (1) Japan 507 teaches providing center grooves of an AIRCRAFT TIRE such that the groove width GW = 8 mm to 14 mm and groove width GW = 0.7 to 1.3 times groove depth Dm and (22) Japan 305 teaches providing the AIRCRAFT TIRE with diameter such as 1168 mm (a tire having a size such as 46 x 17R20 has an outer diameter of 46 inches which equals 1168 mm). When groove width is 14 mm, the groove depth Dm may be 10.76 mm (10.76 mm = 14 mm / 1.3). When the groove depth is 10.76 mm and the nominal outer diameter of the tire is 1168 mm, the groove depth is 0.92% of the nominal diameter of the tire.

As to claim 5, it would have been obvious to one of ordinary skill in the art to provide Japan 305's AIRCRAFT TIRE such that the depth of the center grooves is at least 10.2 mm since Japan 507 teaches providing center grooves of an AIRCRAFT TIRE such that the groove width GW = 8 mm to 14 mm and groove width GW = 0.7 to 1.3 times groove depth Dm. When groove width is 14 mm, the groove depth Dm may be 10.76 mm (10.76 mm = 14 mm / 1.3). The value of 10.76 falls within the claimed range of at least 10.2.

7) **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 305 (JP 04-118305) in view of Corvasce et al (US 6,036,800), Greiner et al (US 3,759,306) and Fourgon (US 5,718,782) as applied above and further in view of Japan 004 (JP 56-079004).**

As to claim 6, it would have been obvious to one of ordinary skill in the art to provide the two layer structure only in the vicinity of the circumferential grooves disposed furthest from the equatorial plane since (1) Greiner et al teaches that the tread base 12b having the high modulus (and high hardness) may be located principally in the regions (either on the sides of at the center) of the scupltured zones (groove zones) which are most exposed to being torn away or stripped (col. 5 lines 9-13) and (2) Japan 004, also directed to a cap base tire tread, teaches that a tread base having a high hardness ("high stiffness") and a low tan delta ("low hysteresis") may be disposed only in the vicinity of the grooves located furthest from the equatorial plane (abstract, Figure 3).

Allowable Subject Matter

8) **Claim 3 is would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.**

Remarks

9) The remaining references are of interest.

10) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Maki whose telephone number is (571) 272-1221. The examiner can normally be reached on Mon. - Fri. 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven D. Maki/
Primary Examiner, Art Unit 1791

Steven D. Maki
August 27, 2010